Also inside: Congrats on Your New Supplier. Got a Prenup? **12**
What's Next for BlackBerry? **8**

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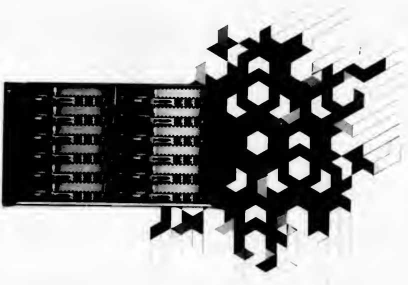

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[1] Based on IBM comparison of configuration and setup by customer onsite versus delivered by IBM using Intelligent Cluster service, which is an optional feature available at additional cost

[2] 3x cores based on industry standard 42U rack comparing 42 1U x3550 M4 rack servers with 2 Intel® Xeon® E5-2600 processors 8 cores each = 672 cores vs 84 NeXtScale System nx360 m4 nodes with 2 Intel Xeon E5 2600 v2 processors 12 cores each for 2016 total cores

[3] SPECint_rate_base2006 669 on IBM iDataPlex dx360 M4 (Intel Xeon E5-2690) vs 918 on IBM NeXtScale nx360 M4 (Intel Xeon E5-2697 v2) www.spec.org Results current as of 9/20/13.

[4] SPECpower_ssj2008 - 5392 on IBM iDataPlex dx360 M4 vs. 7347 on IBM NeXtScale nx360 M4 www.spec.org Results current as of 9/20/13

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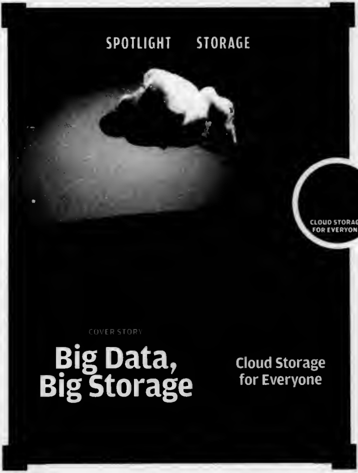

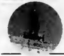

IT Leaders on the Edge

22 First-world tech executives can learn from the way CIOs in developing countries maintain connectivity and keep services flowing.

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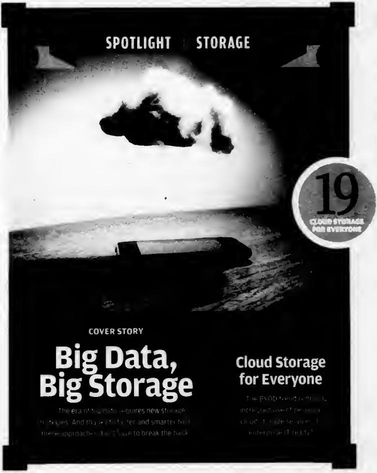

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COVER STORY

Big Data, Big Storage

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Cloud Storage for Everyone

The BYOD trend is driving increased use of personal cloud storage services. Is enterprise IT ready?

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HeadsUp

Oracle Team USA skipper James Spithill (left) and Oracle CEO Larry Ellison greet spectators after the U.S. team defeated Emirates Team New Zealand to win the 34th America's Cup.

REUTERS / STEPHEN LAM

USER GROUPS

Ellison Skips Speech, Angers Users

LARRY ELLISON may have enjoyed watching Oracle Team USA win the America's Cup, but his decision to watch a yacht race instead of speaking to his customers may have hurt his company.

Many users who paid handsome fees to attend Oracle OpenWorld in San Francisco last month felt short-changed when the Oracle CEO skipped his conference-closing keynote to watch the America's Cup regatta on San Francisco Bay.

Ellison's Oracle Team USA was in the midst of an eight-race winning streak that culminated in a comeback victory against New Zealand. But Oracle customers didn't seem to care.

"He shouldn't have done that," said Chris Laxmi, a database administrator who waited in line for 20 minutes to get into the closing session. "I'm disappointed."

Thomas Kurian, Oracle's executive vice president of product development, filled in for Ellison, but many attendees left when they learned that the CEO had canceled.

"I felt like the America's Cup thing was more important [to Ellison] than the event," said Boris Aguirre, a systems integrator from Ecuador who stood in line for almost 40 minutes to see Ellison. "From the perspective of my clients, it was not good."

Ellison's move did little for Oracle's customer relations, said analyst Michael Krigsman of consulting firm Asuret. "While Oracle asks customers to prioritize its products over competitors, Ellison made the decision that racing, his passion and hobby, is more important than customers," Krigsman said via email.

– Chris Kanaracus, IDG News Service

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EMERGING TECHNOLOGY

Stanford Builds Computer With Carbon Nanotubes

Researchers at Stanford University have demonstrated the first functional computer built using only carbon nanotube transistors.

Scientists have been experimenting with transistors based on carbon nanotubes, or CNTs, as replacements for silicon transistors, which may soon hit their physical limits.

The rudimentary CNT computer is said to run a simple operating system capable of multitasking, according to a synopsis of an article published in the journal *Nature*.

Made of 178 transistors, each containing between 10 and 200 carbon nanotubes, the computer can do four tasks summarized as instruction fetch, data fetch, arithmetic operation and write-back, and run two different programs concurrently.

The research team was led by Stanford professors Subhasish Mitra and H.S. Philip Wong.

"People have been talking about a new era of carbon nanotube electronics moving beyond silicon," Mitra said in a statement. "But there have been few demonstrations of complete digital systems using [the] technology. Here is the proof."

IBM last October said its scientists had placed more than 10,000 transistors made of nano-size tubes of carbon on a single chip. Previous efforts had yielded chips with just a few hundred carbon nanotubes.

– JOHN RIBEIRO, IDG NEWS SERVICE

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By John Klossner

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UNIX SERVERS

Fujitsu Won't Cede Unix Market to IBM

DOING BATTLE in a $9 billion Unix server market in seemingly permanent decline is not for the timid. Designing a competitive microprocessor is very costly, so the easy path for smaller vendors is to simply drop out.

Nonetheless, one of those smaller vendors, Fujitsu, says it's in the Unix market for the long haul. The company is committed to developing its Sparc64 chip for Unix servers in an effort to, among other things, keep IBM from monopolizing the business, says Noriyuki Toyoki, corporate senior vice president and the head of Fujitsu's server division.

IBM already has one giant cash cow thanks to its dominance of the mainframe market, and if it came to dominate Unix in the same way — and it already owns more than half the market, according to IDC — the industry and corporate users would lose, according to Toyoki. "Customers need alternatives to get the best value," he said in an interview.

Fujitsu and partner Oracle each develop a version of the Sparc chip. They jointly design Sparc systems and resell each other's products.

Though Oracle has been expanding the role of its own Sparc designs, Toyoki said the future of Fujitsu's own Sparc64 chip is secure. The Unix market may be shrinking, he said, but it is still large enough to support multiple RISC architectures.

"Frankly, we would not use Oracle's Sparc chips in our servers," Toyoki said. He acknowledged that the Oracle chips "are very efficient, especially for throughput operations," but added that Fujitsu's customers need what he called RAS: the reliability, availability and serviceability capabilities that bleed into Sparc64 from its mainframe systems.

Also, he said, Fujitsu is "the last Japanese company doing processor development. We'd like to keep doing it."

Fujitsu is usually listed in the top five Unix vendors, but trails far behind IBM, Oracle and Hewlett-Packard.

– James Niccolai, IDG News Service

Micro Burst

Judges and police investigators made

37,196

requests to Microsoft for end-user data in the first half of 2013.

OPERATING SYSTEMS

Microsoft Wants To Make One OS For All Devices

Microsoft is pursuing an operating system ideal: a unified code base that can run devices ranging from smartphones to servers. The software would give users a consistent look across devices and developers a common development tool set.

"We really should have one silicon interface for all of our devices. We should have one set of developer APIs on all of our devices," Terry Myerson, executive vice president of Microsoft's newly created Operating Systems Engineering Group, said in a meeting with financial analysts.

Microsoft formed the Operating Systems Engineering Group three months ago as part of a broad reorganization. At the time, CEO Steve Ballmer said the group would oversee "all our OS work for console, to mobile device, to PC, to back-end systems" and "core cloud services."

While the idea, though technically daunting, sounds compelling, critics say it's conceptually flawed.

For example, they point out that Apple and Google both have successful dual-OS strategies. Apple has iOS for mobile devices and Mac OS for desktops and laptops. And Google has Android for mobile and Chrome OS for Chromebook laptops and desktops.

JUAN CARLOS PEREZ,
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Utility Confirms Outsourcing Plan

Weeks after telling IT workers it was considering outsourcing tech work, Northeast Utilities says it will cut 200 jobs and turn over some operations to Indian companies. By Patrick Thibodeau

AFTER WEEKS of keeping its IT workers in the dark, Northeast Utilities last week acknowledged that it plans to cut half of its tech jobs and turn over part of its IT operations to a pair of India-based outsourcers.

The announcement made official what was already suspected — the company, which operates New England's largest energy delivery system, had told its IT workers weeks ago that it was considering outsourcing tech work.

NU employs about 400 IT workers and will retain "about half" of them after turning some operations over to Infosys and Tata Consultancy Services, two of India's largest IT service providers. About 40 of the affected employees will be rehired by the outsourcers "and will still work at NU facilities," the company said.

NU said the transition will last from November till June. It is offering employees a voluntary separation package.

An NU IT employee, who asked not to be identified, told *Computerworld* that the earlier heads up had left many people worried about their futures.

David Lewis, CEO at OperationsInc, a human resources consulting firm, called NU's decision to alert employees to the possible outsourcing of their jobs "kind of mind-bogglingly stupid." But he and others didn't discount the idea that the internal announcement was calculated.

Uncertainty can lead people to start looking for new jobs, said Christine Santacroce, business development manager at IT staffing firm Modis in Hartford. And because employers don't have to offer severance pay to workers who leave on their own for new jobs, she noted, a company could save money by dropping hints that cause staffers to worry about their job security. And if a rush of employee departures destabilizes the IT department, the need to embrace outsourcing "becomes self-fulfilling," she added.

Lewis described such a scenario as an example of "artificial attrition," and added, "I'm not saying it makes any sense, but you can see it as a strategy."

NU's initial heads up triggered a backlash led by Connecticut Attorney General George Jepsen and Connecticut House Majority Leader Joe Aresimowicz (D-Berlin), who along with colleagues unsuccessfully urged NU not to cut jobs.

Hartford-based NU last year merged with Boston-based NStar to create an electric and natural gas utility with 3.5 million customers in three states. At the time, the newly merged companies expected $780 million in savings over 10 years.

The job outlook for IT workers in the Hartford area is mixed. The IT job market is not as good as it was five or six years ago, and the state is not seeing a lot of new development. "We're sort of in this holding pattern," Santacroce said.

NU has a reputation for having "a pretty good .Net shop," so its developers are in a good position, as are people with big data and business intelligence experience. Desktop support technicians and telecom and network admins face a tough time, she said.

Santacroce said that in any job hunt, proactive people who move quickly will be in better shape, because a layoff of several hundred IT workers will "inundate the market fairly quickly."

Tom Mazzulla, a senior IT recruiter at iTech Solutions in Farmington, Conn., said NU developers should be able to find something, though it's a difficult market overall.

"Employers are driving the market right now," said Mazzulla. "[That] allows them to be much more particular about who they are going to hire . . . and it allows them to pay less." ◆

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What's Next For BlackBerry?

Set to be acquired by Fairfax, BlackBerry says it will 'refocus' on its core enterprise business even as Gartner advises clients to ditch the vendor's products. **By Matt Hamblen**

THE LIKELY BUYER of troubled BlackBerry, Fairfax Financial Holdings of Toronto, faces a tough road after the close of the $4.7 billion deal, expected next month.

Many analysts say it's likely that the new owner will break up the company, wiping out its smartphone division while preserving BlackBerry's secure network services, which are used by large enterprises around the world.

"What else could Fairfax do other than sell it off in parts?" said Gartner analyst Carolina Milanesi. "[It has] no knowledge or assets to bring to the table, so how could they address the challenges that BlackBerry was facing?"

That feeling is widespread among industry observers, but not unanimous.

"[BlackBerry] faces a huge mountain to climb to get back into the device marketplace," said Jack Gold, an analyst at J.Gold Associates. However, he added, "I don't believe that breaking up the company is the right way to go . . . there's more [long-term] value in keeping the three parts — devices, services and collaboration — intact."

Fairfax and BlackBerry's board agreed to the takeover late last month, days after the smartphone maker quantified just how bad its business is, projecting a $1 billion loss for its fiscal 2014 second quarter, which ended Sept. 30, on sales of $1.6 billion — 45% lower than a year earlier — and announcing plans to lay off about 4,500 of its 12,000 workers. Fairfax currently controls 10% of BlackBerry's stock.

At its height, BlackBerry, as Research In Motion, controlled half the smartphone market for years. It now has market share of just 3% or so. Under Fairfax, it will be a "much smaller and less important player" but will at least survive for a while, said independent analyst Jeff Kagan.

"This is probably the best possible outcome of several unattractive options for BlackBerry," Gold said. The deal — and Fairfax's plan to take the company private — gives BlackBerry officials time to restructure the company without having to deal with investors "breathing down their neck," he added.

"But it won't be easy. Negative press can be a self-fulfilling prophecy, and the market may not be kind to them even if they do provide innovative products and services," Gold said.

In a preliminary announcement of its second-quarter results, BlackBerry said that it is restructuring and plans to "refocus" on its core enterprise business. "We remain steadfast in our mission to deliver the most secure and powerful mobile management solutions and smartphones," the company added in a statement emailed to *Computerworld*.

Gartner made that mission harder when, shortly after the Fairfax deal was signed, it issued a report in which it advised clients now using BlackBerry smartphones and management software to find alternatives by early next year.

Analyst Ken Dulaney, author of the Gartner report, said he made the recommendation after clients raised concerns following the recent spate of bad news at BlackBerry.

Dulaney's report noted that, in a Gartner survey of 400 IT and business leaders in August (before the run of bad news), 42% of the respondents said they now use BlackBerry smartphones, but only 9% said they would still be using them in 2016. ◆

Martyn Williams *of the IDG News Service contributed to this story.*

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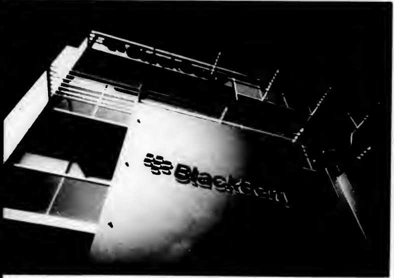
REUTERS



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***Martyn Williams** of the IDG News Service contributed to this story.*

REUTERS

THE Grill

Gino Pokluda

When business demand for databases hit a critical point, this IT leader took control.

Hometown: El Paso, Texas

Family: Wife, an adult daughter and two dogs

Outside pursuits: Pokluda is an ultramarathoner, whose longest run was 77 miles in 24 hours. He's also a published author of steampunk fiction.

What are you reading these days? *Search Inside Yourself: The Unexpected Path to Achieving Success, Happiness (and World Peace)*, by Chade-Meng Tan and *Eat and Run: My Unlikely Journey to Ultramarathon Greatness*, by Scott Jurek and Steve Friedman.

What would surprise people about you? "I owned a motorcycle store called Rider Valley Motorcycles from 2002 to 2006."

PHOTOGRAPHY BY ANGELA GAETO

GINO POKLUDA *had a problem: The database system at Presbyterian Health Plan in Albuquerque, N.M., where Pokluda serves as manager of service improvement and innovation, was becoming increasingly expensive and unwieldy, requiring about 80TB of storage for 13 database environments. To gain control, Pokluda implemented Delphix software to enable agile data management and eliminate redundant infrastructure. The 2012 project sliced his storage needs to 35TB, even though his team now maintains 23 environments. Here Pokluda, who manages all production, test and development environments for the company, discusses the database system overhaul and shares other IT management insights.*

What are your key responsibilities? To look at those things we do now in IT and to get a culture of innovation to take hold here. That's something that hasn't existed in the past. In addition, I'm charged with implementing ITIL best practices throughout IT.

> **We have 100 people in IT, so we have 100 innovators**, and I submit that everyone has at some point innovated and they just don't realize it.

How do you define innovation? I can tell you the things it's not. It's not process improvement. Process improvement is where innovation gets hijacked, and it always revolves around ROI. Innovation, in my mind, is, "What is the job to be done and what is the best possible way to do that?" Innovation doesn't always involve technology. It could be just looking at something differently.

How do you cultivate innovation? The best innovation comes from the bottom up. You get those who are doing the work, and you give them the opportunity to come up with new ideas. We have 100 people in IT, so we have 100 innovators, and I submit that everyone has at some point innovated and they just don't realize it.

Was the Delphix project innovation or process improvement? It was definitely innovation. We were a mainframe shop that got thrust into the world of diversified processing. That made life a whole lot simpler. But in 2005, our payer system [vendor] decided that they were not going to provide any more upgrades. So we had to enter the world of Windows servers and a diversified infrastructure running Facets [a healthcare payer system]. In 2005 we built this Windows architecture running this product and, unfortunately, we had a flawed architecture. As a result, this became a legacy problem we perpetuated until about two years ago when we realized we couldn't keep up with the business demand for databases. That prompted us to look at how we maintain storage and utilize our storage.

What finally prompted the overhaul? Our biggest problem was volume: We had a 1.5-terabyte database for production and a 1.5-terabyte database for development. Multiply that by three or four, and then a couple of configuration environments and testing environments and training environments, and 33% growth each year. All of a sudden, the cost of storage for nonproduction environments is rising exponentially. When we got to 13 environments, we said something's got to change. Also, we could not meet the needs of the business. If they had a large project or a large push for a regulatory requirement and they had to test it, we just couldn't do it.

What sold you on this technology? The virtual databases the product provided acted just like the [original] databases. They were every bit a database except when you looked at the footprint.

How did you devise the solution? I did what everyone else does: I Googled. I was fishing for clues; I was fishing for something out there to see what everyone else was doing, and that's where I came across a white paper written by Delphix for Boeing about how Boeing was experiencing these same issues in their credit union and how they used virtualized databases to solve their problem. We were already well into our journey into VMware, virtualizing our servers. And then you realize that if you can virtualize databases, you can virtualize your entire stack. And when you combine those, virtual servers and virtual databases, you can clone entire environments very easily. I realized that was the way we should go.

What was the biggest challenge? Actually persuading corporate leadership to go this route; convincing them that this new technology was going to be beneficial to them. We convinced them through a number of presentations, and we sold it to them by saying we'll try it for a year and see how it works.

Besides lower storage requirements, what other benefits did you gain with this project? It used to take 50-some-odd days to develop an insurance product, to get that through configuration, development and testing. That time frame has shrunk. Now we can get a product to the customer in about 23 days.

What was the biggest lesson learned from that project? It doesn't have anything do to with the product, but I've learned that IT shops, when they're deeply embedded with their customers, the relationship is more of an ecosystem, because something we do here can affect something down the line or up the line. So the relationship between IT and the customer is approaching a symbiotic relationship rather than a collaboration. I've seen how much this product has enabled us to help the business.

— Interview by Computerworld *contributing writer* **Mary K. Pratt** *(marykpratt@verizon.net)*

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BART PERKINS

Congrats on Your New Supplier. Got a Prenup?

Supplier relationships are rarely 'till death do you part' arrangements.

ENTERPRISES REGULARLY change outsourcers, cloud providers and other suppliers. Such "divorces" usually come about as a result of irreconcilable differences, which might arise from a failure to live up to product specifications, contract metrics or service levels. Or maybe the enterprise merges with or acquires a company that uses a different supplier.

For a number of reasons, supplier relationships are rarely "till death do you part" arrangements, so it's good practice to protect corporate interests by creating a solid "prenuptial agreement" before signing a contract.

To do that, your enterprise has to have enough clout to change a supplier's standard contract. If it does, there are certain terms you'll want to specify.

Data retrieval policy. Suppliers make it easy to load data into their systems. Most offer special tools to facilitate data uploads and are particularly helpful when porting data from a rival's system. But getting data back can be another story. You should specify conditions and the format for eventually retrieving your data. (CSV is most common.) One large organization with a legacy ERP system faced a $60 million project to extract its data because no porting tools existed for the newly selected, competing system.

Early termination costs. Many customers want to be able to terminate a contract early with minimal justification. But suppliers must shoulder high setup costs, and they usually plan to recover those costs over the contract's life. If a supplier suspects you may terminate early, it might increase its prices to compensate for the expected loss of revenue. If you need early termination provisions, determine whether the increased cost is worth it.

Fee ceilings. Though early termination fees vary widely, they can nearly equal the payments due for the remaining contract period. Termination costs can also rise if you need migration assistance. And if the supplier continues to provide you with a separate service, it might impose steep rate increases to recoup some lost revenue. A prenup should limit all of those cost opportunities. But be reasonable and seek what's fair to both parties; overly harsh restrictions could bankrupt a small supplier, leaving you with unsupported services.

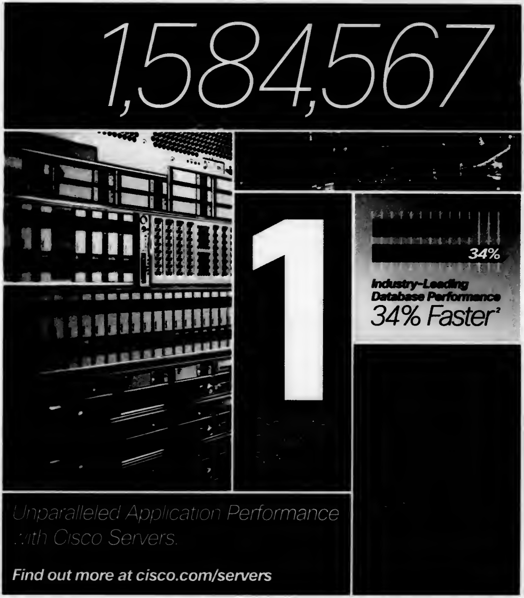
Ownership of proprietary elements. Occasionally, hosting services keep copies of proprietary data or custom extensions to ERP systems or other software packages. Some suppliers argue they have rights to software developed in their server centers. Avoid costly confusion by clarifying ownership of data and intellectual property upfront.

Service levels. Suppliers are not motivated to assign their best people to help customers migrate to a competing supplier. It is critical to specify the type of help to be provided and the speed with which assistance will be performed.

Data retention rules. Some organizations want all their data deleted immediately after termination. Most organizations with a hosted email service want assurance that emails with personally identifiable information cannot be retrieved by anyone, ever. Conversely, organizations migrating to a completely new financial system may want the supplier to retain records for a while.

Supplier selection, like courtship, is a time of optimism. Both sides focus on the new relationship's benefits, and nobody wants to think about possible dissolution. But be realistic before consummating the new contract. A prenup agreement can help you avoid data custody battles and orphaned services. ◆

Bart Perkins is managing partner at Louisville, Ky.-based Leverage Partners, which helps organizations invest well in IT. Contact him at BartPerkins@LeveragePartners.com.



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1 Based on SPECjbb2005 benchmark on Cisco UCS C220 M3 server at 1,584,567 BOPS, 792,284 BOPS/JVM 2 Based on TPC Benchmark C Results on 2 Processor Systems. Cisco UCS C240 M3 High-Density Rack Server with Oracle Database 11g Release 2 Standard Edition One, 1,609,186.39 tpmC, $0.47/tpmC, available 9/27/12 compared to IBM Power 780 Server Model 9179-MHB with IBM DB2 9.5, 1,200,011.00 tpmC, $0.69/tpmC available 10/13/10. 3. Based on SPECjEnterprise2010 benchmark with 8 total Java EE Server processors on Cisco UCS B440 M3 servers at 26,118.67 EjOPS compared to RISC-based IBM Power 780 at 16,646.34 EjOPS. SPEC®, SPECjbb®, and SPECjEnterprise® are registered trademarks of Standard Performance Evaluation Corporation. TPC Benchmark C® is a trademark of the Transaction Performance Processing Council (TPC). The performance results described here are derived from detailed benchmark results available at http://www.spec.org and http://www.tpc.org as of 1-15-2013. ©2013 Cisco and/or its affiliates. All rights reserved. All third-party products belong to the companies that own them. Cisco, the Cisco logo, and Cisco UCS are trademarks or registered trademarks of Cisco. Intel, the Intel logo, Xeon and Xeon Inside are trademarks or registered trademarks of Intel Corporation in the U.S. and/or other countries. All other trademarks are the property of their respective owners.

BIG DATA, BIG STORAGE

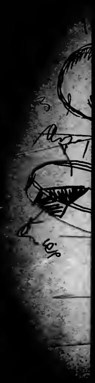
faster and smarter technology,

IG DATA IS NOTHING NEW to Quicken Loans. The nation's largest online retail mortgage lender is accustomed to storing and analyzing data from more than 1.5 million clients and home loans valued at $70 billion in 2012.

BIG DATA, BIG STORAGE

faster and smarter technology,

G DATA IS NOTHING NEW.



But the big data landscape got a little more interesting for the Detroit-based company about three years ago.

"We were starting to focus on big data derived from social media — Twitter, Facebook, Web tracking, Web chats" — a massive amount of unstructured data, explains CIO Linglong He. "How to store that data is important because it has an impact on strategy — not just in storage and architecture strategy, but how to synchronize [that with structured data] and make it more impactful for the company," she says.

Quicken Loans already had a scale-out strategy using a centralized storage area network to manage growth. But it needed more for big data storage — not just scalable storage space, but compute power close to where the data resides. The solution: scale-out nodes on a Hadoop framework.

"We can leverage the individual nodes, servers, CPU, memory and RAM, so it's very fast for computations," He says, "and from cost, performance and growth standpoints, it is much more impactful for us."

Move over, storage giants, and make way for the new paradigm in enterprise big data storage — where storage is cheaper and computing power and storage power go hand in hand.

Data at Warp Speed

When it comes to big data, "storage is no longer considered to be a monolithic silo that's proprietary and closed in nature," says Ashish Nadkarni, an analyst at IDC. "A lot of these storage systems are now being deployed using servers with internal drives. It's almost like Facebook or Google models where storage is deployed using internal drives in servers. Some servers have up to 48 drives in them, and the storage platform itself is all software-driven. It's all done using general-purpose operating systems with a software core written on top of it."

Indeed, in the era of big data, companies are gathering information at warp speed and traditional storage strategies can't keep up.

Stored data is growing at 35% per year, according to Boston-based Aberdeen Group. That means IT departments have to double their storage capacity every 24 to 30 months. "Today, an average of 13% of [the money in] IT budgets [is] being spent on storage," says Aberdeen analyst Dick Csaplar. "Two and a half years from now, it will be 26%, and then 52%. Pretty soon, this ratchets out of control, so you can't keep doing the same things over and over." And while it's true that storage costs are declining, he contends that they're not decreasing quickly enough to offset the need to spend more on storage as the amount of data grows.

The deluge of unstructured data continues to grow as well. "The tough challenge, which everyone is trying to solve, is unstructured data that's coming off documents that you wouldn't have expected to have to mine for information," says Vince Campisi, CIO at GE Software, a unit launched in 2011 that connects machines, big data and people to facilitate data analysis. "The traditional BI principles in concept and form still hold true, but the intensity of how much information is coming at you is much higher than the daily transactions in systems running your business."

How do you build a data storage strategy in the era of big data, scale your storage architecture to keep pace with data and business growth, and keep storage costs under control? Find out from big data veterans who share their storage sagas and explain how they have reinvented their storage strategies.

Lower-End Storage Does the Trick

In close political races, data can make a difference. Just ask the folks at Catalist. A Washington-based political consultancy, Catalist stores and mines data on 190 million registered voters and 90 million unregistered voters — including almost a billion

Mine It, Manage It

BE PRAGMATIC

There isn't just one approach [to big data storage]. You really need to look at the use cases you have internally and understand which technologies would best suit [them]. In the old days, we would try to use one tool and make that tool a sledgehammer for everything. Now we have a whole toolbox. So go out and understand how to use these tools and when these tools apply, and then effectively use them.

— **LLOYD MANGNALL,** VICE PRESIDENT, MIS SYSTEMS ARCHITECTURE, VHA, PARENT COMPANY OF NOVATION

DON'T STORE EVERYTHING

There's a temptation to think that you're just going to store everything. First, that's a fool's errand because it will break the bank. Yes, storage is getting cheaper, but it's not getting cheaper as fast as we're getting more data. And second, it just doesn't make good business sense. Your need for all that data varies with time.

— **JEFF CRIGLER,** CTO, CATALIST

BIG DATA ISN'T FOR EVERYONE

You have to be a fairly large company to generate that amount of data. For [small and midsize businesses], it's about being able to get more and more granular data out of what they've already got, and being able to mine and manage it.

— **DICK CSAPLAR,** ANALYST, ABERDEEN GROUP

CONSIDER OUTSOURCING

Granted, [outsourcing] doesn't always provide the data you need at first blush, but with some effort and custom code, you can get great results.

— **JEFF BROWN,** CTO, CHEEZBURGER.COM, AN INTERNET HUMOR DESTINATION "observations" of people based on pubic records such as real estate transactions or requests for credit reports. The information produced from its analytics tools tells campaign organizers whose door to knock on and can even prompt candidates to change their voter strategies overnight.

"We used to have a big EMC storage system that we retired a while back just because it was so expensive and consumed so much power," says Catalist CTO Jeff Crigler, noting that the EMC system also ran out of space. So the firm built a cluster of NAS servers that each hold about a petabyte of data. "It's essentially a big box of disks with a processor that's smart enough to make it act like an EMC-like solution" with high-density disk drives, some "fancy" configuration software and very modest CPU to run the configuration software.

Csaplar sees a growing trend away from expensive storage boxes that can cost more than $100,000 and toward lower-cost servers that are now capable of doing more work. "As servers get more powerful," he says, "they take over some of the work that you used to have specialized appliances do." It's similar to the way networking has evolved from network-attached hubs to a NIC card on the back of the server to functionality residing on silicon as part of the CPU, he adds.

"I believe that storage is moving this way as well," says Csaplar. Instead of buying big expensive storage arrays, he says, companies are taking the JBOD (just a bunch of disks) approach — using nonintelligent devices for storage and using the compute capacity of the servers to manage it. "This lowers the overall cost of the storage, and you don't really lose any functionality — or maybe it does 80% of the job at 20% of the cost," he notes.

How to store that data is important because it has an impact on strategy – not just in storage and architecture strategy, but how to synchronize [that with structured data] and make it more impactful for the company.

LINGLONG HE, CIO, QUICKEN LOANS

Catalist replaced its "$100,000 and up" boxes with four NAS storage units at a cost of $40,000. "We quadrupled our capacity for about $10,000 each," Crigler says. "That was a year and a half ago," and the cost of storage has continued to go down.

Csaplar says he expects to see more lower-end storage systems on the market as more organizations find that they meet their needs. Big vendors like EMC see the writing on the wall and have been buying up smaller, boutique storage companies, he adds.

The Storage and Processing Gap

Data analytics workflow tools are allowing stored data to sit even closer to analytics tools, while their file compression capabilities keep storage needs under control. Vendors such as Hewlett-Packard's Vertica unit, for instance, have in-database analytics functionality that lets companies conduct analytics computations without the need to extract information to a separate environment for processing. EMC's Greenplum unit offers similar features. Both are part of a new generation of columnar databases, which are designed to offer significantly better performance, I/O, storage footprint and efficiency than row-based databases when it comes to analytic workloads. (In April, Greenplum became part of Pivotal Labs, an enterprise platform-as-a-service company that EMC acquired in March.)

Catalist opted for a Vertica database specifically for those features, Crigler says. Because the database is columnar rather than row-based, it looks at the cardinality of the data in the column and can compress it based on that. Cardinality describes the relationship of one data table to another, comparing one-to-many or many-to-many.

"We have a column in the database called 'State' on every single person's record." But in a database of 300 million registered voters, "it only appears in our database 50 times," he says. "In [row-based open-source relational database management systems like] Postgres and MySQL, it appeared 300 million times. So if you replicate that level of compression on everything from street names to the last name Smith, that plus other compression algorithms buys you tremendous savings in terms of storage space. So your choice of database technology really does affect how much storage you need."

On the storage side, deduplication, compression and virtualization continue to help companies reduce the size of files and the amount of data that is stored for later analysis. And data tiering is a well-established option for bringing the most critical data to analytics tools quickly.

Solid-state drives (SSD) are another popular storage medium for data that must be readily available. Basically a flash drive technology that has become the top layer in data tiering, SSDs keep data in very fast response mode, Csaplar says. "SSDs hold the data very close to processors to enable the servers to have the I/O to analyze the data quickly," he says. Once considered too expensive for many companies, SSDs have come down in price to the point where "even midsize companies can afford layers of SSDs between their disks and their processors," says Csaplar.

Clouds Rising

Cloud-based storage is playing an increasingly important role in big data storage strategies. In industries where companies have operations around the world, such as oil and gas, data generated from sensors is being sent and stored directly to the cloud — and in many cases, analytics are being performed there as well.

"If you're gathering data from 10 or more sources, you're more than likely not backlogging it into a data center" because that isn't cost-effective with so much data, says IDC's Nadkarni.

GE, for instance, has been analyzing data on machines' sensors for years using "machine-to-machine" big data to plan for aircraft maintenance. Campisi says data collected for just a few hours off the blade of a power plant gas turbine can dwarf the amount of data that a social media site collects all day.

Companies are using the cloud to gather data and analyze it on the spot, eliminating the need to bring it into the data center. "Companies like Amazon give you a compute layer to analyze that data in the cloud. When you're done analyzing it, you can always move it from, say, the S3-type layer to a Glacier-type layer," Nadkarni adds.

Glacier is an extremely low-cost storage option that Amazon Web Services announced earlier this year. It's designed for keeping data "on ice" for decades. Other companies are introducing similar cloud-based archiving services, says Csaplar, noting that these offerings are professionally managed at a very reasonable price and could, for example, serve as the ultimate resting place for old tapes.

With prices as low as pennies on the gigabyte, it's hard to pass up. "As long as your data is scrubbed and doesn't have any sensitive information, you can dump it into this kind of archive and reduce your data center footprint," says Nadkarni.

Mainstream enterprises are also showing interest in using the cloud for storing and analyzing data. Some 20% of IT leaders surveyed by IDC report that they've turned to the cloud as a way to augment their analytics capabilities, even though they have their own data centers to perform analytics.

"It's mostly for two reasons," Nadkarni explains. "Many times, these projects aren't done by IT. Second, because of the time to deploy and to go live, many business units find it easier to spin up a couple of instances in the cloud and get going, so it goes from a few weeks to a few days."

Campisi says most of the customers his unit supports are still storing and analyzing data on-site — for now. "We are transitioning to more and more using cloud technology and capabilities to support our strategy. From what I see from customers, it tends to be more of a traditional approach where they use their own internal corporate data center," he says.

For his part, Crigler is trying to figure out how to migrate all of Catalist's data to the cloud. The firm already replicates its database that matches voters' identities to the cloud "because it's a ton of data, and it's used on a very 'spikey' basis," he says. "Four to five months [before] an election, it gets hammered. So being able to expand processing capacity and throwing more disks and CPUs at it is really important."

He's also trying to come up with a strategy that gets the best performance for the money given the demand on that type of data and the need to do analytic queries against historical data.

"It's a big challenge," Crigler says. For instance, "Amazon's Elastic Block [Store] is slow, and S3 is even slower. The best option is the most expensive, which is the attached dedicated storage on the very large Amazon boxes — and that's really expensive. So you have to have a way of analyzing your data and calculating the price-performance curve for different kinds and ages of data, and optimizing your storage based on your real needs."

Though many companies are still grappling with the early stages of their big data storage strategies, it won't be long before hyperscale computing environments like those at Google and Facebook become more commonplace.

"It's happening," says Nadkarni. "This whole server-based storage design is a direct result of department practices followed by Amazon, Facebook, Google" and the like.

In Silicon Valley, startups are offering big data storage systems based on those companies' principles. At VMware's recent VMworld virtualization conference, says Nadkarni, "there were at least a dozen companies with founders who used to be at Google and Facebook."

For legal reasons, the startups can't replicate exactly their former employers' magic, "but the principles are well entrenched in Silicon Valley," Nadkarni says. "In a few years you'll see this hyperscale principle make its way into the mainstream enterprise because there won't be any other way to do it." ◆

***Collett** is a Computerworld contributing writer. You can contact her at stcollett@comcast.net.*

The Right People for the Job

WHAT SKILL SETS will big data storage and analytics require? By 2015, 4.4 million jobs around the world will require big data skills, but only one-third of those jobs will be filled, according to Gartner. IT professionals must acquire the skills needed to connect, analyze and manage any type of information, in any location, using any interface, to help organizations fully realize the potential of big data, according to a report by the research firm.

Dealing with big data requires a unique set of skills that may be scarce in mainstream IT. For traditional data analysis, such as for finance and HR, it's easy to find people who are familiar with a business discipline, who know what each data field means and who can help create reports. But with big data, there's more to it.

"You definitely need someone with business domain expertise," but you also need people who know how to work with data to do machine learning and other techniques to, for example, build an algorithm or a transfer function, says Vince Campisi, CIO at GE Software. Having people with more specialized skills "allows you to stitch together this information and produce an analytic that tells you something you couldn't have otherwise seen," he adds.

Campisi equates this role to actuaries in the insurance industry – those "data scientists of their time" who analyzed data and came up with models or made predictions. "Now every industry is going to have that actuarial type of person that we now call data scientists, who just work at connecting and stitching together this information," he says. "They'll try and find some relationship that no one's thought of, or some curve that's very valuable to know but that no one else has found the formula for yet."

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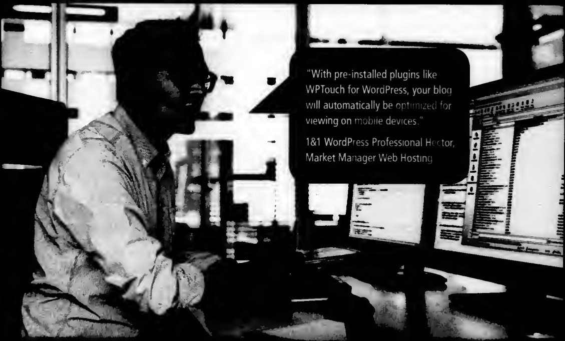

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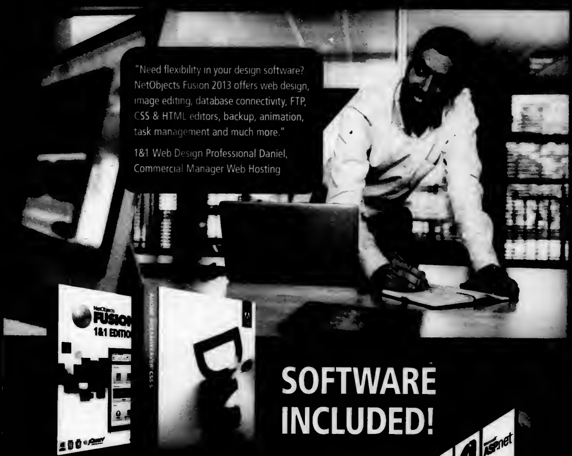

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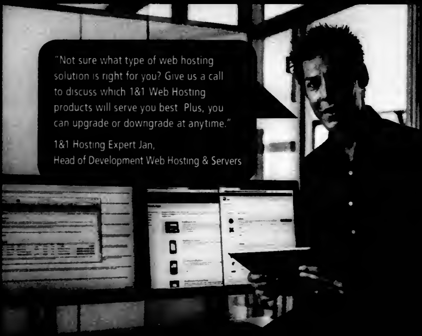

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CLOUD STORAGE FOR EVERYONE

The BYOD trend is driving increased use of **personal cloud storage** services. Is enterprise IT ready? **BY MARY K. PRATT**

RIC HAWLEY knows he has stiff competition.

The CIO at Utah State University, Hawley says he and his team must serve the university's employees and deliver the tools they need. But he realizes that many of the school's users are finding outside options, installing unsanctioned applications that they find easier to use.

"People always gravitate to the most functional or least-cost solution. And in our 'free-

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What You **Don't Know** Can Hurt

MOST IT professionals are well aware of the financial and legal ramifications of breaches of corporate systems.

But they may be overlooking some of the risks associated with employee use of consumer cloud services, because CIOs and IT security teams generally have no visibility into what happens with data when workers move it to the cloud.

"If a server is local, my staff can look for abnormal traffic. But if it's in an Amazon cloud, how do you have access to those same auditing abilities? Do you have to wait and learn about [a breach] in unfortunate ways?" asks Eric Hawley, CIO at Utah State University. "I think that is the bigger question: Do you know whether your employee is putting it somewhere secure or not, or whether it has been compromised?"

Cormac Foster, an analyst at GigaOM, agrees, adding that enterprises can end up in hot water even if there's no actual data loss. Regulated companies as well as companies that handle certain kinds of information, such as medical records and credit card data, must meet certain compliance and audit standards.

"If you don't know what's going where, tracking that is difficult. You might need to track down the origin of a piece of information. Or if someone leaves the company and they've been using some consumer cloud storage, you might not know what they stored. And even if you do, you might not have access to their account," Foster says.

So even though there haven't been any headline-grabbing breaches connected to a worker's unsanctioned use of a cloud service, Foster says regulatory and compliance requirements will likely force many CIOs to deal with that part of their shadow IT organizations.

— MARY K. PRATT

People always gravitate to the most functional or least-cost solution. And in our 'freemium' world, those things are available by the dozen.

ERIC HAWLEY, CIO, UTAH STATE UNIVERSITY

mium' world, those things are available by the dozen," he says.

Hawley says he suspects that employee use of unauthorized IT tools is particularly prevalent these days, as telecommuting and bring-your-own-device policies become increasingly common. People everywhere are becoming more mobile. Empowered first by company-issued laptops and now by their own smartphones and tablets, employees of all stripes want to do their work from any location at any time with any device, and they're turning to the cloud to help them do it — using hosted services to share, store and sync work files with just a click.

"These public cloud services, they're ubiquitous, they're available and they meet the needs better than any of the enterprise products out there on the market from [the employees'] perspective," Hawley says.

Instead of IT-issued tools, people are using cloud services such as Box, Copy, Dropbox, Evernote, Mozy and SugarSync to easily put work files away for later access, analysts and IT leaders say. And some are opting for more specialized cloud-based systems, such as Basecamp for project management and collaboration.

Lynda Stadtmueller, program director for cloud computing services research at Stratecast, a division of Frost & Sullivan, says these services offer the functionality and usability that workers want.

People find free services or just pay out of their own pockets "because it makes their lives so much better," says Frank Gillett, an analyst at Forrester Research. "We've been calling that 'bring your own service.' People are self-provisioning."

CIOs call it a dilemma.

"There's typically a policy or verbal statement that says you shouldn't be using that stuff for business, but there's the realization that they are," Gillett says. And while the IT and security departments in the past took a locked-down approach to technology, "that era is ending," he says. "You can't control people who have lots of gadgets."

Moreover, CIOs would be hard-pressed to find enterprise options that are as user-friendly as the cloud-based consumer tools, analysts say. On the other hand, they'd be equally chal-

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Moreover, CIOs would be hard-pressed to find enterprise options that are as user-friendly as the cloud-based consumer tools, analysts say. On the other hand, they'd be equally challenged to find a consumer service that meets all of the security and auditing requirements that a business demands.

Cormac Foster, an analyst at GigaOM, says technology leaders are developing policies and deploying technologies to help them deal with this world of shadow IT.

They're moving beyond mobile device management and mobile application management systems, which allow IT to control and secure devices and the work applications authorized for use on those devices. Now they're finding ways to sanction cloud-based storage and file-sharing apps. Each approach has benefits and drawbacks.

In some cases, Foster says, enterprises are turning to the very tools that workers are using on their own. For example, he notes that Box, a content-sharing site, is now developing tools that will allow IT to administer employee use of the site, set up role-based access and even grab reports out of it.

Analysts say other organizations are deploying Microsoft SkyDrive or Evernote, both of which offer enterprises some level of control and security along with visibility into what work-related items users are putting into the cloud. But those tools might not offer all of the features that workers would like, and they might not meet all of IT's requirements, either.

Other enterprises are setting up virtual desktop environments that enable individuals to access work applications from any device, Stadtmueller says. Virtual desktops provide the access that mobile workers want, and, because data does not reside on employees' devices, they offer the security that enterprises need. The downside, says Stadtmueller, is that they require a lot of bandwidth, and workers might think they aren't flexible enough.

Gillett says we're in a transition period in which IT is forced to react to the continued blurring of the line between users' personal and professional lives, devices and applications. The technology isn't capable of blending the two sides seamlessly yet, but it's moving in that direction, he says. Nor is today's technology capable of identifying information and automatically determining whether it's nothing special or whether it's proprietary, and therefore in need of a higher level of security.

So, for now, organizations are learning how to balance workers' needs and the enterprise's requirements, Gillett says.

"What we expect to see, but don't see much yet, is a tiered approach to people and information. So instead of the all-or-nothing approach, there's a classification of people and information," Gillett explains. IT might decide it's OK for workers to use cloud-based tools for everyday tasks, but the CFO might place strict limits on employee use of mobile devices and unsanctioned applications, including cloud storage and file-sharing services.

"We're in this awkward period. IT has to figure out how to get people to do the right thing," he says.

Hawley takes that approach at Utah State. Last year his IT team deployed management software on every device it could, both university-owned and personal, in order to identify patterns on local hard drives and thus gain better insight into where data is going. He acknowledges that the tool can't look for data that people put into the cloud, but it can flag patterns suggesting that kind of activity. When it does that, Hawley's team will talk with workers, not to reprimand them, but to find out what IT can do to better support them while also better securing sensitive data.

"It's incredibly labor-intensive," he says, "but I think it's worth every minute."

There's much more work ahead, says Tim M. Crawford, a CIO strategic adviser and a member of the Society for Information Management. Technologists will have to delve deep into their infrastructures to make the changes required to give workers that easy access to files from any device while also offering enterprises control and security.

Crawford says one of the biggest challenges to doing that will be the limitations of older applications, which don't work well in the cloud. But it's a challenge that CIOs will have to face.

"You're going to have to touch those legacy apps that you've been kicking down the road" like a can, he says. "Because when you move to cloud services, you have to change your paradigm. IT has got to start looking at cloud services as a different paradigm, and some are. It's a transition. You're not just switching one technology for another." ◆

Pratt *is a* Computerworld *contributing writer in Waltham, Mass. Contact her at marykpratt@verizon.net.*

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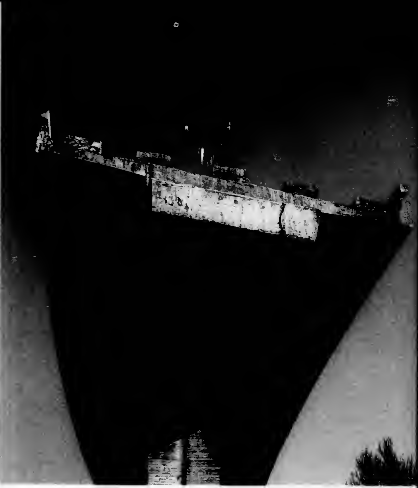

IT Leaders on the Edge

A Y IT LEADER in the mood to complain out excessive regulation should first e a cocktail with Murat Mendi of bel Îlaç, an Istanbul-based manufacrer of generic pharmaceuticals. ormerly CIO and now general manager of the company, which operates in 25 countries around the world, can talk about the time an overzealous

First-world tech executives can learn from the way CIOs in developing countries maintain connectivity and keep services flowing. **BY HOWARD BALDWIN**

THINKSTOCK

bulldozer operator started excavating the foundation for a new structure next to his company's building without bothering to first confirm what might have been underground. It tore through Nobel's Internet cables, leaving hundreds of employees offline all day.

Arguably, something like that could happen in Indianapolis too, but there would still be key differences: In Turkey, there aren't many rules or regulations regarding the protocol that should be followed before excavation begins and there are few options for restitution if something goes wrong. "That's part of the culture here," Mendi says. "If something happens, they'll say, 'Oops, sorry,' and move on."

The bulldozer incident encapsulates many of the issues CIOs in emerging markets have to deal with: an unreliable infrastructure, the twin devils of too much or too little oversight, and the need for managers to understand local culture, whether they're on-site or halfway around the world. And yet, like Mendi, tech leaders in emerging economies persevere and sometimes even find joy in conquering the seemingly endless challenges, little and big, that crop up day in and day out.

Computerworld talked with CIOs and IT experts in Pune, India; Sao Paulo, Brazil; Macau, China; and sub-Saharan Africa — and two traits they all seem to share are resilience and ingenuity in keeping the lights on, the Internet up and employees productive under less-than-ideal conditions. As business becomes more global, their stories offer lessons that IT leaders in developed countries can learn from.

'A Completely Different Ballgame'

Business practices that are common in countries with established economies and stable governments can be "a completely different ballgame" in developing regions of the world, says German Valencia, CIO of shared services at DHL, a Bonn, Germany-based logistics company whose 500,000 employees do business in almost every country.

"We cannot assume everything is the same everywhere," Valencia says, citing varying costs of technology, connectivity issues, the skill sets of the local populace and aging equipment as just some of the challenges. Telecommunications may be "unreliable, outdated or even government-controlled," he warns. "Something as simple as Internet access can be exponentially more expensive than what you'd pay in the U.S., Europe or Asia."

"When you're in the U.S., you assume abundance. The mindset shifts completely in a developing country," says Niraj Jetly, CIO of Edenred USA, who previously served as CEO of a healthcare startup with offshore operations in Delhi, India. "You have a mentality of scarcity. You think about how you can be frugal while still meeting business needs."

Venkat A. Krishnan discovered that when he was CTO at Indian automaker Mahindra & Mahindra and his CEO charged him with building a factory from the ground up in Chakan, India. A former agricultural hub, Chakan is about 20 miles from Pune, the nearest city. There, "from the ground up" means something a little different from what it does in the U.S. or Europe.

In 2008, Mahindra committed to building an automobile factory in Chakan that would be part of a manufacturing hub that the government hoped would someday rival Detroit (GM, Mercedes-Benz and Volkswagen are among 10 manufacturers with facilities there now). But at the time, the site not only had no factory, it was also what's known as a "greenfield" — it had no roads, water or electricity, explains Krishnan.

Krishnan first brought in what we in the U.S. call modular computer systems and what are known in India as trolley containers: 20-foot trailers powered by generators that each contained a network rack with 24U Hewlett-Packard ProLiant servers running everything from file-and-print services and databases for attendance tracking to project management tools and Cisco VoIP services for telephony and videoconferencing. That got the project started.

Next came contingency planning, with connectivity being the highest priority. "There was a lot of simultaneous development activity. The bulldozers would routinely cut through the fiber, and getting it back up again took four to eight hours," says Krishnan. His solution: "We set up a hybrid system that combined wired and wireless." When the wires were

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cut, the wireless was there for backup.

But that wasn't the only contingency plan Krishnan needed. "We focused on building high availability into every layer of the plant," he says. "We have 100% redundancy on everything — servers, storage, databases, applications." Why? When you're in "the middle of nowhere," it's hard to get replacements — for hardware or staff — in a timely fashion. "Building in redundancy protects you from the tyranny of distance," he adds.

Labor and Laws

Finding and retaining employees, which is a challenge in developed countries, is especially tricky in emerging markets, CIOs say. The astonishing growth in some areas only aggravates the issue. "The vast majority of companies in India and [other parts of] Asia are driven by one characteristic: growth," says Ralf Dreischmeier, global leader of the IT practice at Boston Consulting Group. "I've seen banks in India growing revenues by 30%. Telcos might grow even faster." That makes it hard for companies to keep employees, especially when they're enticed by large, established companies like Infosys and Wipro.

As is the case in developed countries, organizations in emerging markets that can't pay as much as bigger operations must try to attract employees with other enticements. For example, Dreischmeier says that Boston Consulting advises companies in that situation to offer training programs. In many countries, he notes, "it's easier to get government funding for a training program than it is setting up a business. That's a key lever to get the right talent on board."

In particularly remote regions, it's especially important to find skilled people. "Our on-site IT staff has to be multiskilled," says Mark Reilley, director of IT at the Washington-based Elizabeth Glaser Pediatric AIDS Foundation, which has medical facilities scattered across sub-Saharan Africa. "The team here in Washington uses remote tools to log in to a desktop to tweak settings, and we visit on a fairly regular basis, but the IT technician there has to be able to deal with desktop, server and connectivity issues."

To offload work from those key employees and make the entire team more productive, Reilley has set up internship programs in Zimbabwe, Kenya and Mozambique (with more planned in Tanzania and Ivory Coast) to bring in college students majoring in IT-related subjects to help the on-site staff. "They may not have a full IT skill set, but they can set up printers to free up the dedicated IT person to focus on higher-level issues such as business continuity," says Reilley.

Sometimes employers' labor practices run afoul of, or at least get bogged down by, local labor laws. Over the past 20 years, Roger Seshadri, CIO at gaming and entertainment company Melco Crown Entertainment, a $4 billion developer of casinos and hotels, has opened properties everywhere from Peru and Curacao to a riverboat on the Ohio River in Indiana. He's currently working on a resort in Macau.

Because Macau is so small and its IT talent pool even smaller, he had to bring in IT professionals from 12 countries, including Australia, Malaysia and the Philippines, to get the right expertise for his team of 150, Seshadri says. But that involved getting work permits, and "vendors need a local company to act as their partner," he explains.

Work permits are easier to get in nearby Hong Kong, where Melco Crown has a corporate office. But because the two cities are still separate "special administrative regions" as defined by China, Seshadri can't move his 25 Hong Kong-based IT employees to Macau. His workaround: "We bring them over by ferry for meetings and then they go back. But even then they still have to go through immigration, which has long lines. It's only a one-hour ferry ride, but it can take them three hours to get here. It is not that easy to deal with, but we manage."

Sometimes laws relate not to people, but to technology. Gustavo Roxo, a Booz & Co. partner for IT and operations in Sao Paulo, cites taxes as an issue there and elsewhere in South America. In a developed country, he says, hardware and telecommunications usually represent 40% of the total cost of a project. In Brazil, they account for 80% of the total.

That's because, thanks to taxes, a server costs twice as much in Brazil as it does in the U.S. "After companies invest in hardware, they have less to invest in getting innovation through new software. It's an innate challenge here," he says. CIOs need to be aware of tax laws, if only to explain to counterparts in other countries why costs are so much higher. Fluctuating exchange rates and inflation wreak havoc with budgets as well.

How to Make IT Work From Anywhere

Simplify. "It's tempting to try new stuff," says Reilley, "but you have to think about who's going to support it. Define and enforce standards, and then choose your policy exceptions carefully." For instance, the Pediatric AIDS Foundation has standardized on Windows PCs and doesn't use Macs, not because Macs are harder to support, but because it's simpler to support just one platform.

A policy of keeping things simple works with staffing, too. "My experience in India taught me to think in terms of living with scarcity but still delivering results," says Jetly. "I'm always thinking about how I can do the same thing with fewer resources. If I think I need a team of 10 people for an optimal solution,

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Sometimes employers' labor practices run afoul of, or at least get bogged down by, local labor laws. Over the past 20 years, Roger Seshadri, CIO at gaming and entertainment company Melco Crown Entertainment, a $4 billion developer of casinos and hotels, has opened properties everywhere from Peru and Curacao to a riverboat on the Ohio River in Indiana. He's currently working on a resort in Macau.

Because Macau is so small and its IT talent pool even smaller, he had to bring in IT professionals from 12 countries, including Australia, Malaysia and the Philippines, to get the right expertise for his team of 150, Seshadri says. But that involved getting work permits, and "vendors need a local company to act as their partner," he explains.

Work permits are easier to get in nearby Hong Kong, where Melco Crown has a corporate office. But because the two cities are still separate "special administrative regions" as defined by China, Seshadri can't move his 25 Hong Kong-based IT employees to Macau. His workaround: "We bring them over by ferry for meetings and then they go back. But even then they still have to go through immigration, which has long lines. It's only a one-hour ferry ride, but it can take them three hours to get here. It is not that easy to deal with, but we manage."

Sometimes laws relate not to people, but to technology. Gustavo Roxo, a Booz & Co. partner for IT and operations in Sao Paulo, cites taxes as an issue there and elsewhere in South America. In a developed country, he says, hardware and telecommunications usually represent 40% of the total cost of a project. In Brazil, they account for 80% of the total.

That's because, thanks to taxes, a server costs twice as much in Brazil as it does in the U.S. "After companies invest in hardware, they have less to invest in getting innovation through new software. It's an innate challenge here," he says. CIOs need to be aware of tax laws, if only to explain to counterparts in other countries why costs are so much higher. Fluctuating exchange rates and inflation wreak havoc with budgets as well.

How to Make IT Work From Anywhere

Simplify. "It's tempting to try new stuff," says Reilley, "but you have to think about who's going to support it. Define and enforce standards, and then choose your policy exceptions carefully." For instance, the Pediatric AIDS Foundation has standardized on Windows PCs and doesn't use Macs, not because Macs are harder to support, but because it's simpler to support just one platform.

A policy of keeping things simple works with staffing, too. "My experience in India taught me to think in terms of living with scarcity but still delivering results," says Jetly. "I'm always thinking about how I can do the same thing with fewer resources. If I think I need a team of 10 people for an optimal solution,

Discussion
Underway

(want in?)

[illegible]

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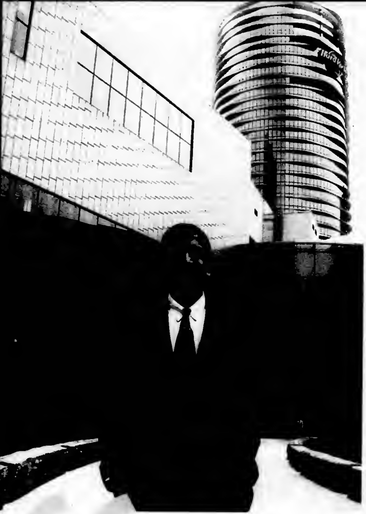
COMPUTERWORLD
on Linked in



When you're venturing into unknown territory, you have to mitigate risk.

ROGER SESHADRI,

can I deliver something that might be less perfect with fewer people?"

Mitigate. Think about what can go wrong and plan for it. That outlook could take into account anything from floods and civil unrest to customs regulations. "When you're venturing into unknown territory, you have to mitigate risk," says Seshadri. That's why system redundancy comes up so many times in conversations with emerging-market CIOs. Reilley, for example, issues satellite phones in Africa as a backup in case the network goes down.

IT leaders likewise agreed that another simple way to mitigate infrastructure risk is to build browser-based systems that let employees work offline while inputting data into an application and then uploading it when a connection is available.

Collaborate. If you need help, ask for it. Increasingly, CIOs in emerging markets are working with local vendors and outsourcers to fill gaps in their teams. That means relying on third parties to bring in staff resources when the CIO's company might not be able to. A benefit of using third-party personnel is that they can help you deal with cultural issues.

At the same time, if you're a global CIO, you must work with on-site staffers. "Learn to bridge cultures, time zones and distance," says DHL's Valencia. "Team engagement is essential, because our local IT teams know what's best in their environment."

Silver Linings

All this may make life as a CIO in an emerging economy sound difficult, but the fact is that there are innumerable silver linings.

For example, Booz & Co.'s Roxo says that one of the byproducts of technology being so expensive in Brazil is that business and IT work more closely together because they can't afford mistakes or delays.

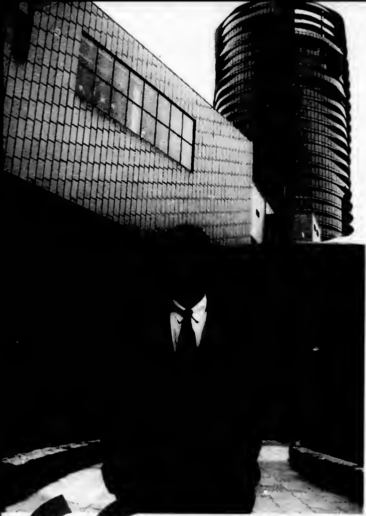
And in Africa, wireless communication is actually more prevalent than wired. Reilley says that gives his colleagues more flexibility to work wherever and whenever they need to.

And handling a greenfield project in a country like India means you have no legacy issues to deal with and are able to leapfrog technology cycles and derive a competitive advantage from the outset.

In general, starting with a blank slate lets IT leaders be more innovative. Mahindra's Krishnan was able to deploy from the start a dashboard that lets the IT team monitor every device in the factory, from the servers to the controllers. The factory itself, to increase sustainability and reduce dependence on other power sources, uses solar, wind and other renewable energy sources.

And then there's the personal payoff. Says Krishnan: "Every challenge is an opportunity. Faced with building a factory in Chakan, I believed that my staff could do it and I could lead it. And now we're up and running." ◆

Baldwin *is a Silicon Valley-based freelance writer and frequent contributor to* Computerworld.



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[illegible] White Paper #5 (assuming 40 employees

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Security Manager's Journal

MATHIAS THURMAN

Email Change Opens Many Holes

Trouble Ticket

» [illegible] that corporate email can be forwarded to external account.

» [illegible] That's not supposed to be allowed, so audit the email system to see if anything else has changed.

I **TOOK SOMEBODY'S WORD** for something, and I didn't subsequently check it out to my own satisfaction. Result: big trouble. Lesson: always verify.

I learned that lesson last week, when one of my security analysts notified me that our data loss prevention (DLP) tool had detected an incident involving some source code leakage. When we initially set up our DLP rule for such events, we got a lot of false positives, so we partnered with engineering, which provided us with strings of characters (commented out in the code) that would indicate the leakage of our most sensitive source code — the algorithmic portions of the code that sets our products apart.

[illegible] computerworld.com/blogs/security

The trigger for this particular event was a senior software engineer in India sending a snippet of code from his corporate Microsoft Exchange email account to his personal Gmail account. When confronted, the engineer told us that he had set up a rule to auto-forward all of his corporate email to his personal account. He did this, he said, because he hasn't been issued a corporate laptop and he wanted to work from home.

There were other options, but he didn't know about them. He was unaware, for example, that he could access his corporate email from home via Outlook Web Access (OWA), or that he could access some applications via the corporate clientless SSL VPN portal.

Tip of the Iceberg?

This was all interesting, but it begged a question: Why was it even possible to auto-forward to an external account?

And now to my failure to verify. We recently migrated from an on-premises Microsoft Exchange environment to Microsoft's Office 365 hosted Exchange. During the architecture review, I was assured that all of our security settings, including the one preventing auto-forwarding, would migrate to the hosted environment. So much for assurances. Now I was worried. Email is probably our No. 1 repository of sensitive data, including sales forecasts, customer and personnel data, prerelease financial information and, of course, source code.

To rectify the oversight, I initiated an audit of the Office 365 deployment, and we uncovered several other configuration differences from the previous Exchange deployment. For one thing, the deployment was supporting POP and IMAP, enabling employees to use third-party email clients and apps that could give them email access from mobile devices while bypassing Microsoft ActiveSync and the security policy that we apply to mobile devices to enforce the use of device passwords, enable device timeout and support remote wiping.

Another discovery was that employees could use the Microsoft Outlook application on any PC, on or off the corporate network. When Exchange was on-premises, the only way a remote user could access corporate email was via VPN. This increase in availability is bad, because once email is pulled down to a client, it remains there, even after the user exits Outlook. Using OWA is preferable, since it's browser-based; once the browser is closed, all email is removed (as long as the user clears the cache and any temp files).

What will help? Mobile device management might, and we hope to deploy that next year. Then there's the use of machine certificates, which can be issued to corporate PCs for validating authorization to access the Outlook client. We could do that while still providing some flexibility related to OWA and mobile devices, via ActiveSync. We've also spoken to Microsoft about this, and we'll be investigating our options with Office 365 a bit further.

One thing's certain: The email team's never-ending list of action items just got a good deal longer. ◆

This week's journal is written by a real security manager, **"Mathias Thurman,"** *whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com.*

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Security Manager's Journal

MATHIAS THURMAN

Trouble Ticket

Email Change Opens Many Holes

Migration to a new email platform wouldn't alter any of the security settings, our manager was assured. Wrong!

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SENSAPHONE

PAUL GLEN

Avoiding Blame Is a Silent Career Killer

> **Geeks have an all-too-common compulsion to avoid being blamed for anything.**

THERE'S A SILENT KILLER attacking the careers of technical people. It runs rampant through organizations, destroying the future job prospects of even the most talented geeks. They end up sidelined, passed over for promotions or laid off. Sadly, this killer can lead us to engage in some self-destructive, dysfunctional behaviors.

I'm talking about geeks' all-too-common compulsion to avoid being blamed for anything. (And if the thought "I would never do that" just passed through your mind, you are doing it without even being aware of it.)

Nearly every geek has some degree of this tendency. It's just part of our DNA, inextricably intertwined with the reasons we chose technical work in the first place. We love problem-solving and finding the right answer. Conversely, we hate being wrong.

The desire to avoid blame shows up at work in three distinct behaviors, none of them helpful.

Being defensive. When things go wrong and you say something like, "Hey, it's not my fault," you send a number of negative messages all at once. You sound petulant and immature, like a kid who just knocked over a lamp. And you seem more concerned with yourself than the work or other people. Rather than discussing how to make things better, you're focused on your image — without realizing what a poor image this conveys.

Blaming others. Another dysfunctional response to things going wrong is to blame other people. "Hey, Sandy chose that platform, so don't blame me." Here again, you sound immature and self-centered. But this time it's worse. You also sound disloyal to your colleagues.

Preventing blame. The most subtle, pervasive and insidious form of avoiding blame happens long before things go wrong. Here, you position yourself to be immune to blame, thus demonstrating that avoidance is a primary concern even when nothing has gone wrong. This is usually expressed through "CYA" behaviors like officiousness, unnecessarily rigid adherence to process or preemptive defensiveness. You'll say things like "Don't blame me when this falls apart" or "I'll be happy to change the color of that button after you submit a change order."

Although this version usually doesn't give people the impression that you're immature, it does radiate self-centeredness. And worse, it not only gives the impression that you are more concerned with protecting yourself than doing good work, it also ensures that the impression is accurate. If you focus your creative energy on avoiding blame, you have less creativity to focus on your work.

So how do you get out of this trap? The first step is to recognize that you're in it. This can be hard, since blaming yourself can be the most painful blame of all.

Once you've accepted that you engage in blame avoidance, you can do two things to break the habit. First, you can recognize the impulse and choose a different response. Second, you can ask colleagues to privately point it out. Just telling them that you want to work on it goes a long way.

No amount of technical talent can overcome the career damage of blame avoidance. If it's infected your career, you owe it to yourself and your colleagues to address it right away. ◆

Paul Glen, CEO of Leading Geeks, is devoted to clarifying the murky world of human emotion for people who gravitate toward concrete thinking. His newest book is *8 Steps to Restoring Client Trust: A Professional's Guide to Managing Client Conflict*. You can contact him at info@leadinggeeks.com.

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Career Watch

TOUGH CUSTOMERS

	Interview difficulty rating (1-5)	Interview experience (% positive)
Google	3.6	59%
Citrix Systems	3.4	62%
Amazon	3.4	60%
Adobe	3.3	71%
Microsoft	3.3	70%
Facebook	3.3	67%
Salesforce.com	3.3	60%
VMware	3.2	75%
NetApp	3.2	67%
Oracle	3.1	75%

NO EXIT

Retirement is beginning to seem like an elusive goal to a big chunk of the U.S. workforce.

According to a study published last month by HSBC, 18% of working-age Americans believe they will never be able to afford to fully retire. That compares to an average of 12% for all 15 countries, of varied economic development levels, where HSBC surveyed 16,000 people.

Insufficient planning and the global economic crisis were just about neck-and-neck as the most commonly cited reasons for why post-retirement income hadn't met the expectations of those respondents who are already retired.

WHY INCOME FALLS SHORT

Insufficient planning	35%
Global economic crisis	34%
Unexpected expenses	24%
Still supporting children	21%
Debt	21%
Still supporting parents	7%
Fall in value of home	6%
Inheritance less than hoped	4%

Note: Multiple responses allowed.

ASK A PREMIER 100 IT LEADER

Judy Batenburg

[illegible]

learning more about business.

I am an IT manager who has been moved out into the business. I am now in daily contact with the people whose business activities I have always supported from a somewhat insulated position, and I am amazed at how little I understand about business itself. How can I quickly and effectively get myself up to speed? First, congratulations on knowing what you don't know! That's the first step. I would suggest a multipronged approach. First, immediately start reading up on your industry. What are the trends? What forces are acting to change your industry? What are the challenges? And what is being said about your company and its challenges and opportunities? Next, take advantage of experts – the ones you are working with right now, and/or ones in your network. Identify key approachable people in critical areas of the company and ask questions about how they see their role in the company – what are their challenges? In general, people love to talk about what they do and the challenges they face. Offer to take someone to lunch in return for a tutorial on the business. If applicable, identify conferences in your industry, and ask for permission to attend. Identify someone within the business who can mentor you, and ask them for help.

If you have a question for one of our Premier 100 IT Leaders, send it to **askaleader@computerworld.com**, and watch for this column each month.

After eight years in IT support and support management, I am not sure where to specialize. Any tips on the best area to get into right now? The best place to start is to figure out what areas of IT excite and interest you. If you aren't interested in it, you won't be happy. Talk to teammates and managers in other areas and find out what they do and whether it sounds interesting. Look at industry trends; big growth areas right now are social media, IT security, data management/big data, mobile and cloud. Take a look at job boards and see what skills employers are seeking, or look at industry articles to see what skills they predict will be in demand over the next few years.

I have always done everything I can to keep my skills up to date. I'm in my 30s now and am interested in moving into more of a leadership role. What courses or training do you recommend? Courses and training are great, but the best way to move into a leadership role is to take advantage of opportunities to show your leadership. These opportunities are usually all around you, but sometimes you don't notice them until you are ready. Volunteer to be the lead on a project or identify a project or function or service that needs to be done but is not being done. Then do it. I hear people say, "When you give me the leadership position, I will be a leader." That's not how leadership works. When you show others that you are taking the initiative and showing leadership, then they will begin to think of you as a leader.

Career Watch

TOUGH CUSTOMERS

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Citrix Systems	3.4	62%
Amazon	3.4	60%
Adobe	3.3	71%
Microsoft	3.3	70%
Facebook	3.3	67%
Salesforce.com	3.3	60%
VMware	3.2	75%
NetApp	3.2	67%
Oracle	3.1	75%

NO EXIT

- Insufficient planning
- Global economic crisis
- Unexpected expenses
- Still supporting children
- Debt
- Still supporting parents
- Fall in value of home
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ASK A PREMIER 100 IT LEADER

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The vice president of IT infrastructure and operations at Starz Entertainment offers advice on **learning more about business.**

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Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: K. Moultrie Please reference job # below:

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#1615.7262 C++; multithread; perf monitor & test of Cross Data Ctr ntwrks; Python, & Stateful Syst test.

#1615.3943 large syst sw design & dvlpmnt; test automation; data struct & algorithms; C++ or Java, Jscript; script lang; & Linux.

Business Systems Integrator (Mountain View, CA) #1615.7141 Design analytical solutions that answer complex business decisions. Exp incl: srvcs & integrations using SOA Fusion Middleware, industry stand protocols & messages using Rosettanet; Oracle SOA, B2B, Java, & PL/SQL; Unix &/or Linux; Perl, Shell, or Python; XML; Java dvlpmnt environ & web srvcs; full syst implement life-cycles, info mgmnt, data model, syst integration, & dvlpmnt methodologies; & SOA proj dplymnt, migration, & integration.

Product Manager (Mountain View, CA) #1615.3396 Take responsibility for Google product from conception to launch. Exp incl: C++ or Java; SQL, Python, & HTML, OOD & OOP, & leadership of large cross funct teams.

Webmaster (Mountain View, CA) #1615.6301 Design, develop, modify, and/or test Google's web-based systems, architecture, and related features. Exp incl: HTML, CSS, Jscript; web usability; responsive design, user design exp, & dvlpmnt of int'l websites.

Technical Program Manager (Mountain View CA) #1615.6648 Coordinate regional and global technology programs for Google. Exp incl: script to extract, load, & transform data from multiple sources, oper & maint of ETL & data pipelines; run data loads & troubleshoot data issues, quantitative data analysis using SQL; database design & arch; coding & design to process data; mgmnt of pricing proj for customers & prod in the tech industry; & proj & prog mgmnt.

Technical Solutions Engineer (Mountain View, CA) #1615.1618 Integrate Google products with customer technologies. Exp incl: C++, Java, and Python, Jscript & SQL, distrib syst; & design & implement web app.

Support Engineer (Mountain View, CA) #1615.5522 Design, develop, modify, and/or test software needed for various Google projects. Exp incl: Java, Python, Jscript, or C++; UNIX or Linux; cloud arch, distrib comp, agile proj mgmnt; agile methods, & SQL or non-relational databases

Software Engineer Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:

#1615.4816 Java, JUnit; Python; Jscript; HTML, multithread, SQL query optimize & MySQL, & mach learn.

#1615.5197 algorithms & data-struct; multi-thread; C++ & STL; Java; Python; design & implement large scale distrib syst; MapReduce, & NLP.

#1615.6671 C++; multi-thread, SQL, large scale data process, unit-test; debug; data struct, web srvcs, & distrib syst;

#1615.715 Java, Jscript, Proto Buffers, Closure, C, & C++; design patterns, UX design, & CSS simplification libraries, templating & frmwrk libraries; migrating med size datasets, GIT, HTML, XML, & JSON; in-browser debug tools; internet RFC stand; CSS & HTML; code audits, privacy & security issues, XSS, & COPPA; & bldg large scale AJAX apps

#1615.3779 C++, Java, & Python; Jscript, data struct & algorithms; sw arch design & optimize; & memory mgmnt & database mgmnt.

#1615.2466 Unix & Linux syst; tech troubleshoot & perf tuning; revision control, test driven dvlpmnt; large-scale distrib syst; dvlpmnt of web-based apps & multi-tiered syst; & dvlpmnt & maint of parallel apps. Any 3 of: C++, Java, Python, Jscript & Shell

#1615.3152 OOP lang & dvlpmnt environ, including C, C++, STL, Python, shell scripting, & Unix; data struct & algorithms, probability & stats; knowledge based computation, & nat lang process.

#1615.7274 C & C++; multi-core & multi-thread dvlpmnt; distrib sw infrastruct & distrib file syst dvlpmnt, deploy, maint, & oper; low-level Linux kernel dvlpmnt, test, debug, & troubleshoot; dvlpmnt, patch, modification, integration, & maint of open-source sw; OOL; device driver dvlpmnt; ntwrkng; & virtualization & sandboxing tech

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Computer Professionals for CA based IT firm. Sr S/W Engineers. Plan, dsgn, dvlp, enhance, customize, direct & implement s/w systems. Coordinate s/w programming, system testing, validation procedures & dvlpmnt of documentation. Implement adv s/w module components in complex database systems & computing environments on diff O/S etc. Sr.Programmer Analysts, Plan, dsgn, dvlp, create, test & modify comp applications s/w & specialized utility programs. System dvlpmnt & implementation in web based applications on diff O/S using latest technologies. Dvlp interfaces & reports. Travel & Relocation for short periods throughout US may be required for above two positions. Programmer Analysts: Dsgn, dvlp, create & modify comp applications s/w &/or specialized utility programs. Anlyz user needs & dvlp s/w solutions using multiple tools on diff O/S. Please mail 2 copies of resume mentioning the position applied to À HR, Shubh Solutions, LLC. 10225 Barnes Canyon Rd., Suite # A206, San Diego, CA 92121.

ERA Helicopters LLC in Houston, TX seeks Ramco Business Analyst. Qualified applicants will possess a Bachelor's degree in Computers, Electronics, Instrumentation, or related field and 2 years of experience in the job offered or 2 years of related experience in information technology including at least 1 year of experience with Ramco systems. Please send resume to nbarry@erahelicopters.com. Must put job code 429 on cover letter/resume.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: K. Moultrie Please reference job # below:

Search Quality Strategist (Mountain View, CA) #1615.5301 Execute high level business operations and strategy projects defined by Google's executive team. Exp incl: HTML, PHP or Perl, CSS, Jscript; relational databases & SQL, Python, C++, or Java; & LINUX Command line.

Senior Strategist, Product Quality Operation (Mountain View, CA) #1615.4956 Research and analyze market for Google products and services. Exp incl: C, C++, Java, Jscript & Python; Internet-based risk, abuse, fraud or security; UNIX or Linux environ; numerical analysis, algorithms & data-mining; HTML, web srvr, & TCP, & web app or mobile app dvlpmnt landscapes.

Test Engineer (Mountain View, CA) #1615.5105 Design, develop, modify, and/or test various Google projects needed for various Google projects. Exp incl: design, testing, & debug large scale distrib syst; OOP; app of OOD principles on large scale proj; design & implement scalable web automation testing frmwrks; test automation strategy & technologies, test automation tools; design & implement sw algorithms; SQL, TCP/IP; & info retrieval.

Product Manager (Mountain View, CA) #1615.3190 Take responsibility for Google product from conception to launch. Exp incl: dvlpmnt of prod strategy, dvlpmnt & design of prod using tools, prog web interfaces; UI, creation of prod offerings & tech & strategic analysis of prod offering improvements, prog in C++ & SQL, database design, & mach learn stat analysis methods.

Software Engineer Positions (Mountain View, CA): Design, develop, modify, and/or test software needed for various Google projects. Exp. incl:

#1615.5444 C++, STL, Java & Python; multithread & parallel syst; large distrib syst w/fault tolerance; TCP/IP, HTTP, SMTP & SSL ntwrk protocols; op syst kernel prog; & Unix or Linux internals.

#1615.4084 C++ or Java, large scale computational geometry prog, design & dvlpmnt of algorithms, industry practices for sw design & arch; source control syst, & unit test

#1615.5621 Java & C++; optical ntwrkng, perf, monitor, & test large scale optical ntwrks, ntwrk control plane syst & data cntr switching; layer-2, layer-3, or layer-4 ntwrk protocols & tech; & design RESTful API.

#1615.6422 OOP in C++; Perl or Python, Windows, UNIX, & SunOS, & algorithms & data struct.

#1615.1267 Java, C++; distrib compute; probability theory for data model, analysis & mining, data struct & algorithms, & design & dvlp prog to parse formal lang into interpretable struct.

#1615.7291 Java, web app, Jscript, AJAX, JSON; OOP & design, SQL, & PL/SQL.

#1615.5053 C or C++ multithread, STL, distrib file syst & distrib database syst; design of fault tolerance & recovery methods fordistrib syst; & prob & perf analysis of large scale distrib syst.

Sr. Programmer Analyst: Analysis, design, develop, maintain, install, test computer software programs. Test, debug software application. Skills required: Java, J2EE, OOAD, UML, GOF Design Patterns, C#, ASP.NET, VB.NET, ASP, T-SQL, SQL, ORACLE, MYSQL, SAP ABAP, SAP BI, UNIX & WINDOWS PLATFORMS, WEB SERVICES Req. Matrix One PLM, AEF and eMatrix Software, ETL Batch Process running in Mainframe, (Bachelor's+5 yrs. Exp) or Master's, Travelling required, send resume to SSINFOTEK INC., 9560 Research Drive, Irvine, CA 92618

Programmer Analyst: Analysis, design, develop, maintain, install, test computer software programs. Test, debug software application. Skills required: Java, J2EE, OOAD, UML, GOF Design Patterns, C#, ASP.NET, VB.NET, ASP, T-SQL, SQL, ORACLE, MYSQL, SAP ABAP, SAP BI, UNIX & WINDOWS PLATFORMS, WEB SERVICES Req. Matrix One PLM, AEF and eMatrix Software, ETL Batch Process running in Mainframe, Master's in Computer or equiv, Travelling required, send resume to SSINFDTEK INC., 9560 Research Drive, Irvine, CA 92618.

Systems Analyst: Analysis, design, develops, maintain, install, test computer software programs. Test, debug software application. Skills required: Java, J2EE, OOAD, UML, GOF Design Patterns, C#, ASP.NET, VB.NET, ASP, T-SQL, SQL, ORACLE, MYSQL, SAP ABAP, SAP BI, UNIX & WINDOWS PLATFORMS, WEB SERVICES Req. Matrix One PLM, AEF and eMatrix Software, ETL Batch Process running in Mainframe, Bachelor's or equiv and 2 yrs of exp. Travelling required, Send resume to SSINFOTEK INC., 9560 Research Drive, Irvine, CA 92618.

Project Lead: Lead software project. Analysis, design, develop, maintain, install, test computer software programs. Skills required: ASP.NET 2.0/3.0/3.5, C#.NET, VB.NET/, ADO.NET, Linq, XML, XSLT, Java Script, Web Services, WCF Services, WPF, AJAX, MS-SQL Server 2008/2005, Design Patterns and MVC Architecture. Bachelor's +5 yrs. Exp. Travelling required, send resume to SSINFOTEK INC., 9560 Research Drive, Irvine, CA 92618.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: K. Moultrie Please reference job # below:

Network Engineer (Chicago, IL) #1615.7041. Deploy, design and maintain private data networks. Exp incl: field basedwork in POPs, carrier hotels, data centers or central offc environ; rack & stack, installation, commission & maint of routers & ntwrk equip, creation of rack elevations & install docs for srvce providers or enterprise ntwrks, IP ntwrks, OTDR, OSA, or BERT; cable dressing & mgmnt; perf of AC & DC power installs, dvlpmnt & maint of local vendor relationships, troubleshoot new & existing Transport & Layer 3 pltfrms, creation & implement metro DWDM design packages, Layer 1 Outside Plant Fiber characterization & remediation, & implement metro design pckgs.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn: K. Moultrie. Please reference job # below:

Software Engineer Position (Boulder, CO) Design, develop, modify, and/or test software needed for various Google projects. Exp incl #1615.8027 doc of functionality, workflow, data input & output, integration w/ other syst; perf, data error handling, & syst alert reqmnts for distrib app; impact analysis & effort est; design & dvlpmnt of code for distrib app, Java & SQL prog lang; test strategy, dvlpmnt of test code, & execution of tests; dvlpmnt support for in-prod syst; & C++.

Computer Professionals (East Windsor, NJ) IT firm. Jr Lvl positions Programmer Analysts, Database Administrators, Quality Analysts, Business Analysts and Sr. Lvl positions Sr. S/w Engg, Sr Prog. Analysts, Sr. Business Analysts, Sr. QA Analysts, Sr. Business Systems Analysts, Sr. Systems Adminsto plan, direct, or coordinate activities in such fields as electronic data processing, info systems, sys. analysis, bus. analysis & comp. programming. Apply w/2 copies of res. to Angelita Arguello/HR Executive, Cloudeeva, Inc, 104 Windsor Center Drive, Suite # 300, East Windsor, NJ – 08520

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Test Engineer (NY, NY) #1615.7656 Design, develop, modify, and/or test software needed for various Google projects. Exp incl: Python or Perl; Java; Selenium & Selenium WebDriver brwsr automation, large data set analysis & process, distrib file syst mgmnt & prog; large vol, high freq distrib syst validation & test; sw test automation, Unix & Linux environ, & dvlpmnt of test plans for display ad syst.

Research Scientist (NY, NY) #1615.1636 Research, develop, and test Google products. Exp incl: nat lang process, mach learn, semi-supervise learning; C++, Java, or Python, & sw dvlpmnt.

Software Engineer Positions (NY, NY) Design, develop, modify, and/or test software needed for various Google projects. Exp incl:

#1615.985 OO UI dvlpmnt; web srvr-client commun; Java, HTML & Jscrpt; AJAX, & user-facing app exp

#1615.5711 C++ or Java; UNIX; stat or mach-learn; algorithm dvlpmnt; distrib syst; &design, test, dvlpmnt & implement of sw

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 Attn K. Moultrie Please reference job # below:

Software Engineer Position (Seattle, WA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl: #1615.3637, C, C++ or Java, Python, Perl, Shell or PHP; algorithms & data struct; test & debug code; Linux, comp ntwrkng; & parallel & distrib prog.

Software Engineer Position (Kirkland, WA) Design, develop, modify, and/or test software needed for various Google projects. Exp incl: #1615.3506 Java, C# or C++; Jscrpt; front-end dvlpmnt; web srvcs, distrib syst; OOP; & AJAX, XML, HTML, and CSS

BlackBerry Corporation (aka Research In Motion Corporation (US)), Irving, TX, positions are available:

TX7075 - Senior Interoperability Test Specialist

TX7076 - WiFi Interoperability Test Specialist

TX7077 - RF Designer

BlackBerry Corporation (aka Research In Motion Corporation (US)), Alpharetta, GA, positions are available:

GA7078 - Business Intelligence Developer

BlackBerry Corporation, Milford, CT, positions are available:

CT7083 - Software Developer

Submit resume to BlackBerry Corporation, P.O. Box 141394, Irving, TX, 75014-1394 U.S.A., referencing appropriate job title and requisition number.

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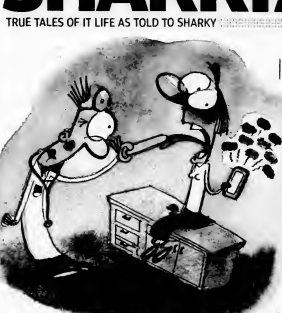

HAL MAYFORTH

And You Thought That No One Was Indispensable

This pilot fish is the only IT staffer at her company who's familiar with the IP phone system, despite years of asking for a backup. "I had to leave the office one day for a scheduled-well-in-advance doctor's appointment," says fish. "'Murphy' knows a golden opportunity, and the phone system went down shortly after I left the office. The frantic call center supervisor called my internal extension, then my cellphone. Getting no answer on either, she charged into the IT department and demanded to know where I was. (A glance at her Outlook calendar would have told her.) My co-worker looked at the clueless supervisor meaningfully and informed her that I had a doctor's appointment. The supervisor looked at him uncomprehendingly and asked, 'Well, why isn't she answering her cellphone?' "

Unclear on the Concept

It's the mid-1990s, and this big company has just moved into its shiny new downtown headquarters, complete with a fully reworked and centralized network. Not long after the move, this network admin pilot fish gets paged one Saturday evening by a frantic VP, who says the network went down just as he was trying to print thousands of pages of a critical report. Fish heads downtown at once, but it's an hour and a half after answering the page when he finally walks through the data center doors and sees what the VP has done. There stand a PC and four heavy-duty laser printers that the VP has set up. The printers are plugged into daisy-chained power strips, which the VP has plugged into the power distribution unit that basically powers the entire network. "I don't know how something like this could happen on the very weekend I had so much work to do!" moans the VP. "I only got about 2,000 pages printed out of the 6,000 I need to get done! My PC and printers went down, so I moved them to another plug, but they just went down again. The same thing happens every time!" Sighs fish, "Two weeks later, a large glass wall went up in front of the racks with a secured door that would only open for the networking group and server team."

And Really Unclear

IT pilot fish is accosted by a co-worker in the hall. "Hey, I need to show you a problem I'm having when working from home," user says. OK, what's up? fish asks. "Well, I brought my Internet with me today." You brought your what? "My Internet." Not sure what you mean, man. "I brought, you know, that thing – the modem – so you can see the problem I'm having at home."

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OPINION

S.J. VAUGHAN-NICHOLS

The Web at 20: What's to Come in Next 2 Decades?

The younger you are, the harder it is for you to imagine living without the Web.

THIS IS AS GOOD A TIME AS ANY to wish the Web a happy birthday. It's been a bit more than 20 years since I first wrote about what I then referred to as the "World-Wide Web." I might want to pat myself on the back for jumping on that subject pretty early, but I did spend a good chunk of that article touting something called WAIS before I ever got around to what I also styled as "the WEB."

But next month marks the 20th anniversary of the Mosaic Web browser, which gets a lot of the credit for bringing us the Web most of us now know and use every day. And that was true even before Mosaic became, by way of Spyglass, the basis for Internet Explorer 1.0, in 1995.

Many changes have been wrought in the past two decades. And I think many more are in store.

Think about 1993. By then, it wasn't unusual in the West to use PCs at work, but 90% of what we did on them was with local programs. Email was pretty much the only way we could "talk" to co-workers and friends over the network, and many of us couldn't even use that over the Internet.

Thanks to broadband and Web browsers, we now do everything over the Internet. Indeed, with the Chromebook and Chrome OS, Google is trying to prove that anything we'd want to do can be done over the Web. And you know what? Google may be right.

In 2013, our friends and office mates may be scattered around the globe, but they're only a keystroke away on social networks, VoIP or videoconferencing. Today, as long as you're not working at Yahoo, you can pretty much work anywhere in the first world, and in much of the second world for that matter. Don't believe me? Ask Mike Elgan, a *Computerworld* columnist and digital nomad who's been working for the past year in places as far-flung as Italy, Spain, Morocco, Kenya and Turkey.

The younger you are, the harder it is for you to imagine what it would be like to live without the Web. And in 20 more years, very few of us will be able to live without it. Trying to foresee the future is a chancy business, but I'll take a stab at it.

First, the Web is only going to become more ubiquitous. Google is onto something. You really can do almost everything with Web apps today. Tomorrow, we'll drop the "almost."

That's because of two developments. The first is the slow, but steady, growth of universal broadband. In the U.S. today, the average Internet speed is a mere 8.6Mbps, but Google Fiber has shown us that 1Gbps speeds are possible and affordable. By 2033, we'll have that kind of speed in large cities, making it possible to use tools like CAD, CAM and video editing systems over the Web — activities that would be painfully slow with today's technology.

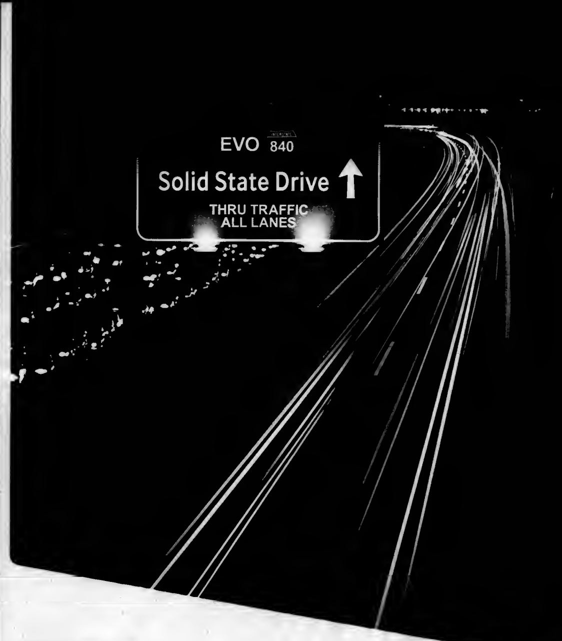
The other part is the rise of HTML5 and its eventual successors. Today, developers still argue over HTML5 vs. native apps. But proof is mounting that software as a service and HTML5 apps can equal native apps in performance and speed.

Put this together and you get a world where the traditional PC and PC-centric operating systems such as Windows are as dead as the telegraph.

We won't think about browsers. We'll just expect computing from our glasses, our cars' "heads-up" displays and, heck, our contact lenses.

By 2033, all the world will be on the Web, and we won't think a thing of it. Except, perhaps, when we're thinking about the bad old days when we had to actually sit in front of a computer or hold a smartphone or tablet to get to it. ◆

Steven J. Vaughan-Nichols has been writing about technology and the business of technology since CP/M-80 was cutting-edge and 300bps was a fast Internet connection – and we liked it! He can be reached at sjvn@vna1.com.



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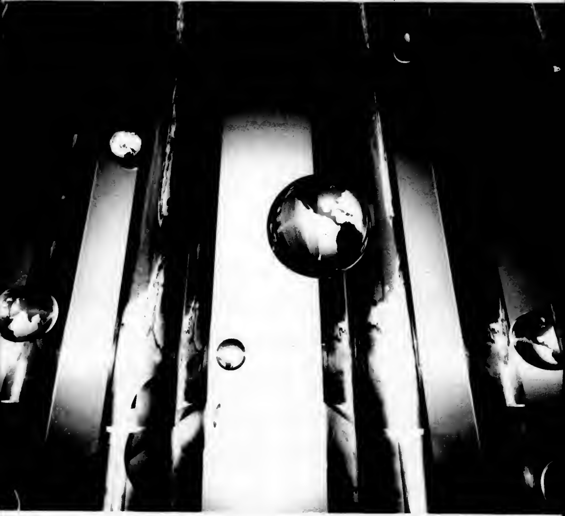

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